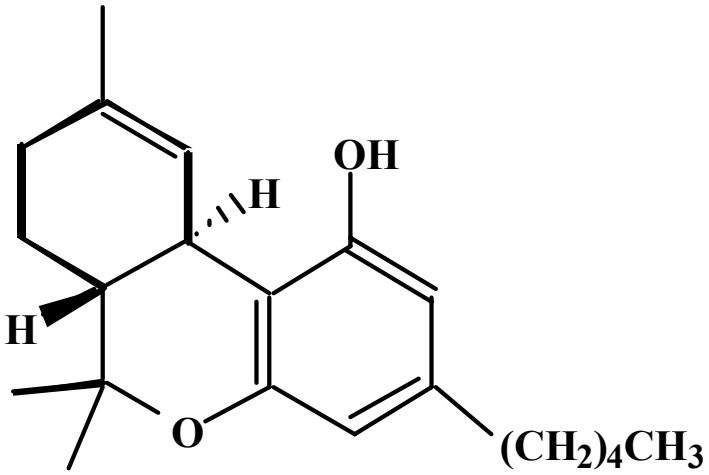
Neuropharmacology/Neuroimaging

Brain Cannabinoid (Marijuana) Receptors

BROOKHAVEN
NATIONAL LABORATORY

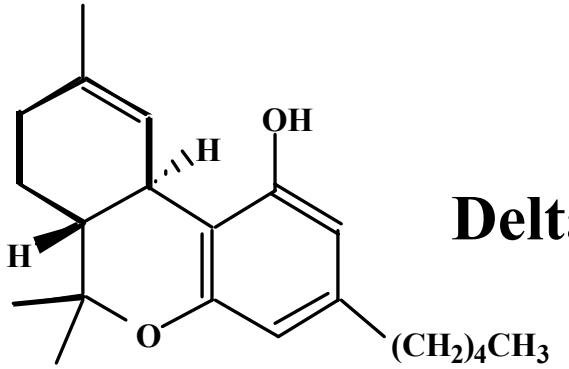
Delta^{9}-Tetrahydrocannabinol from Cannabis sativa



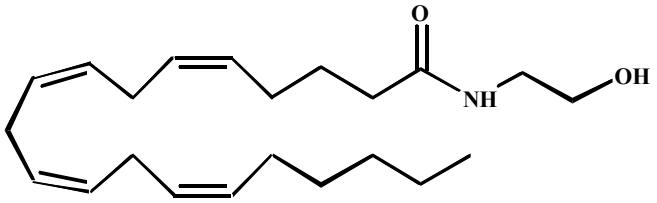
History of the Cannabinoid Field

since 100 BC	Use of cannabis for medicinal purposes
1988	Discovery of a receptor for Δ^9-tetrahydrocannabinol in the brain (CB1 receptor)
1992	Identification of anandamide as an endogenous activator of the brain cannabinoid receptor
1993	Discovery of a second type of cannabinoid receptor located on macrophages (CB2 receptor)
1995	Identification of 2-arachidonylglycerol as a second endogenous activator of brain cannabinoid receptors

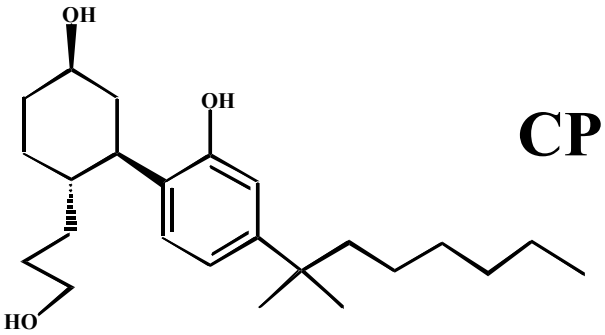
Agonist and Antagonist Ligands for Cannabinoid Receptors



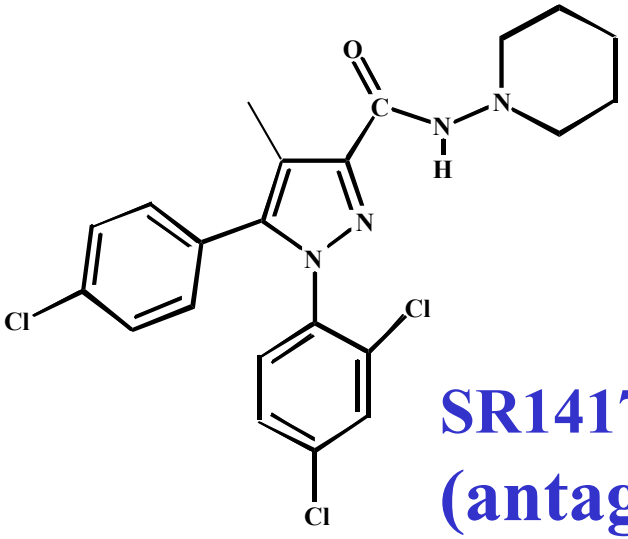
Delta^9-THC



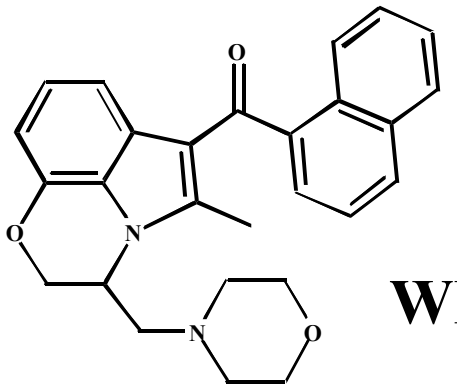
Anandamide



CP 55,940



SR141716A (antagonist)

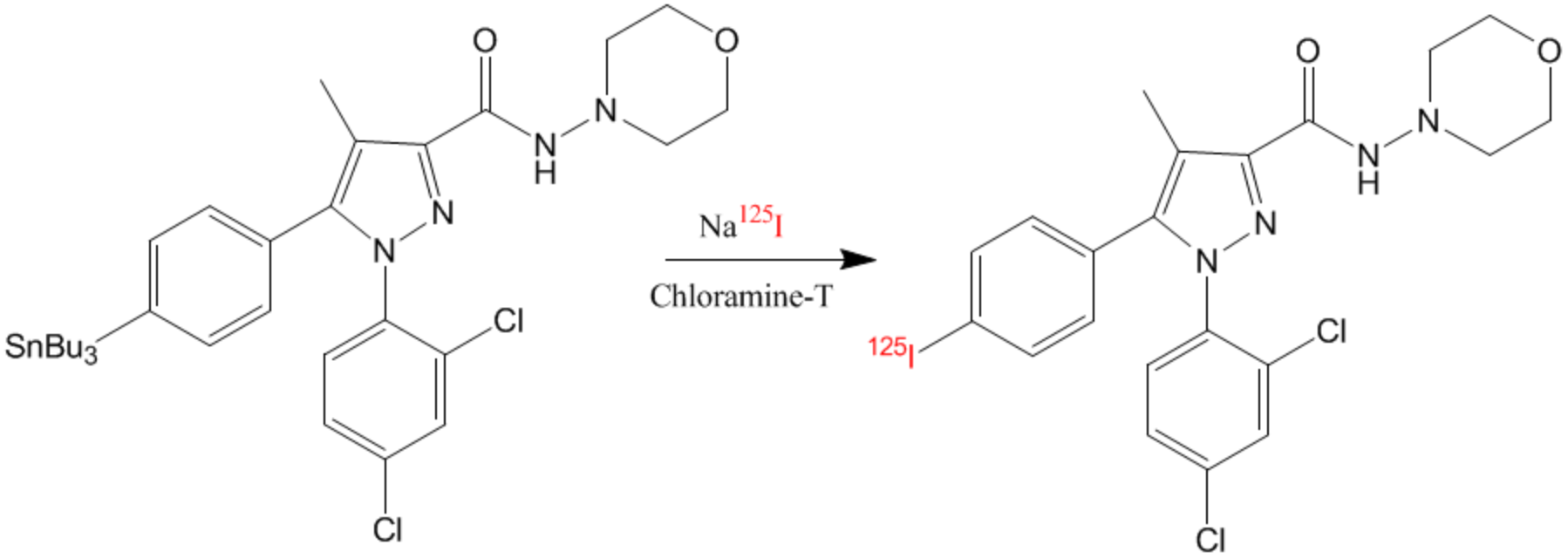


WIN 55,212-2

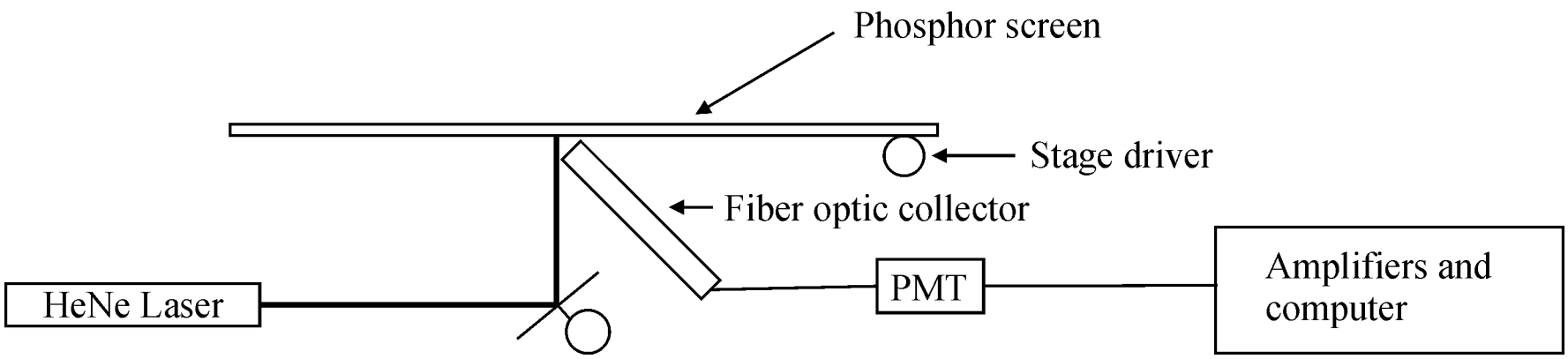
Development of a Radioactive Imaging Agent for Cannabinoid Receptors

Cyclotron

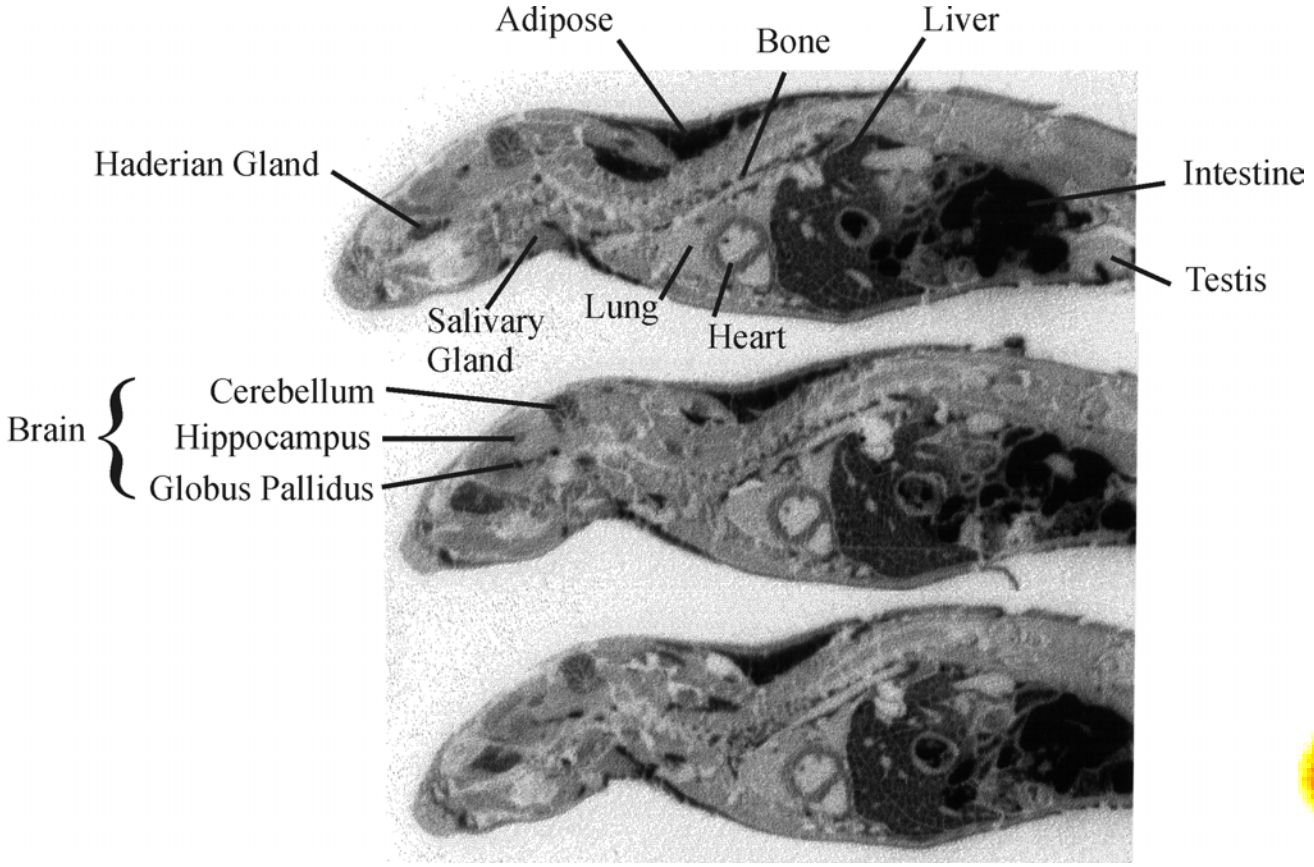
Radioiodination of AM281



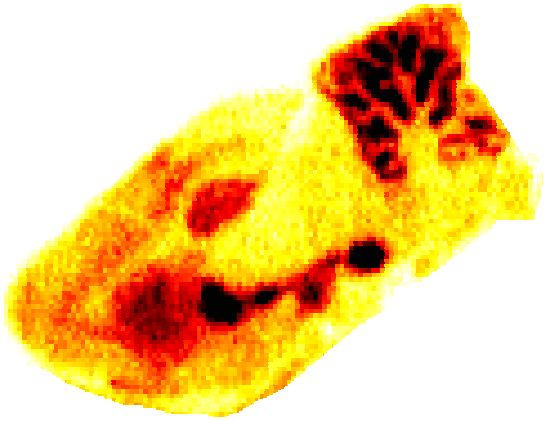
Inside the phosphor imager



Imaging Cannabinoid Receptors with $^{123/125}$I-AM281



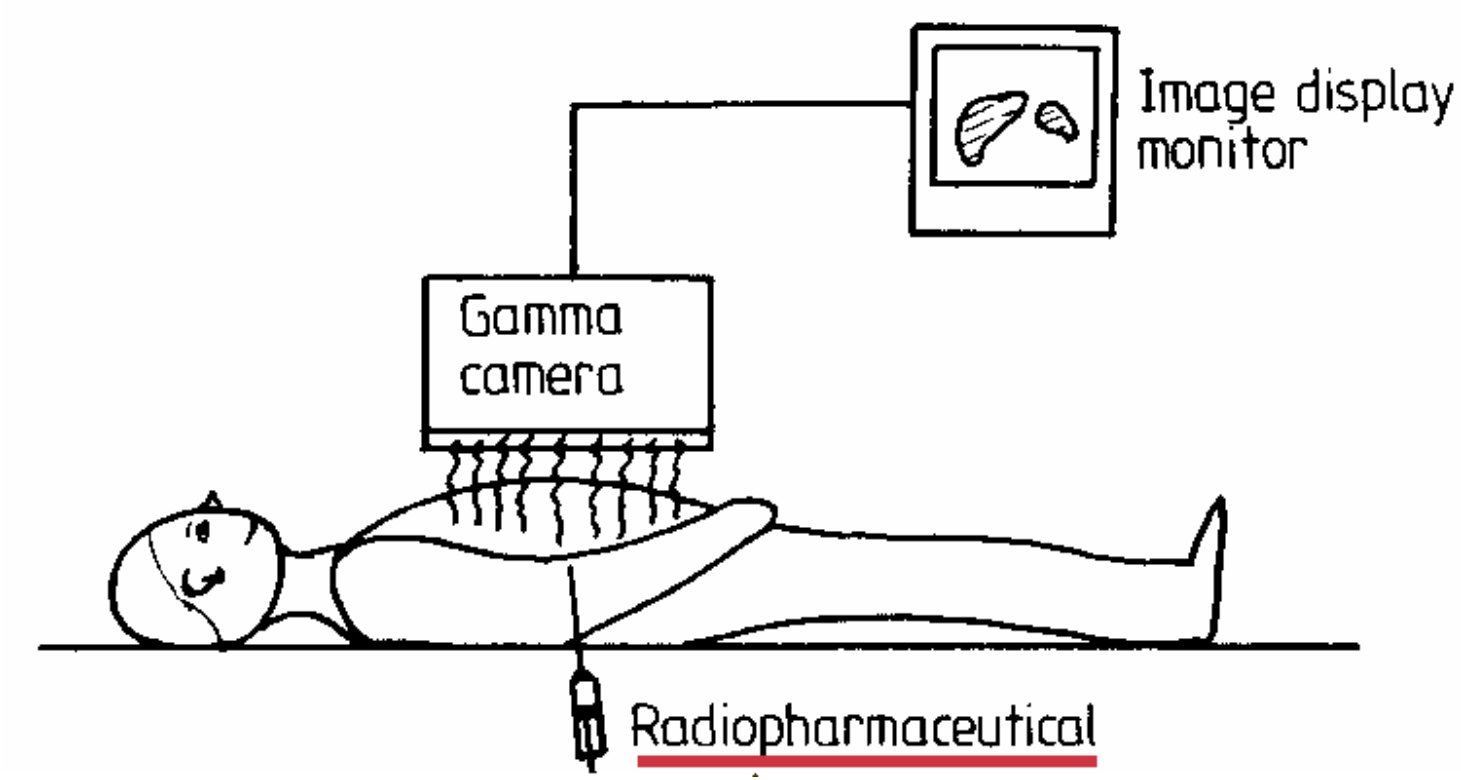
Rat: Whole Body



Rat Brain

Imaging Cannabinoid Receptors Using Single Photon Emission Computed Tomography (SPECT)

SPECT



SPECT

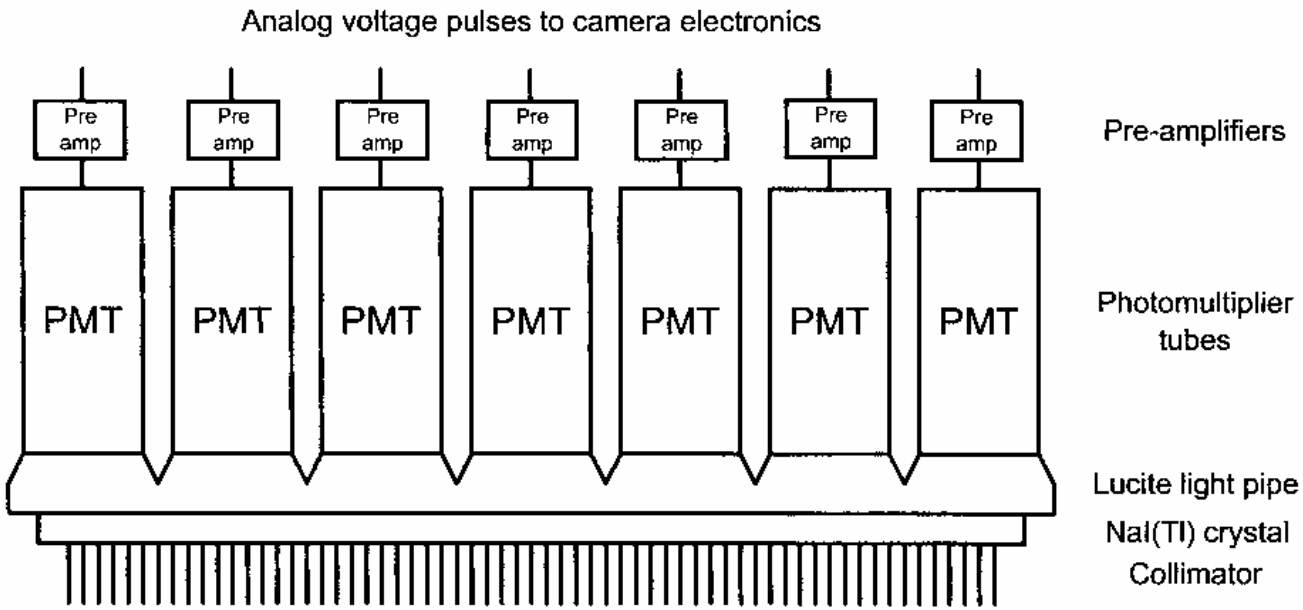
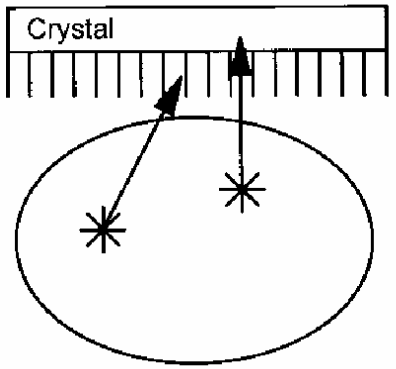
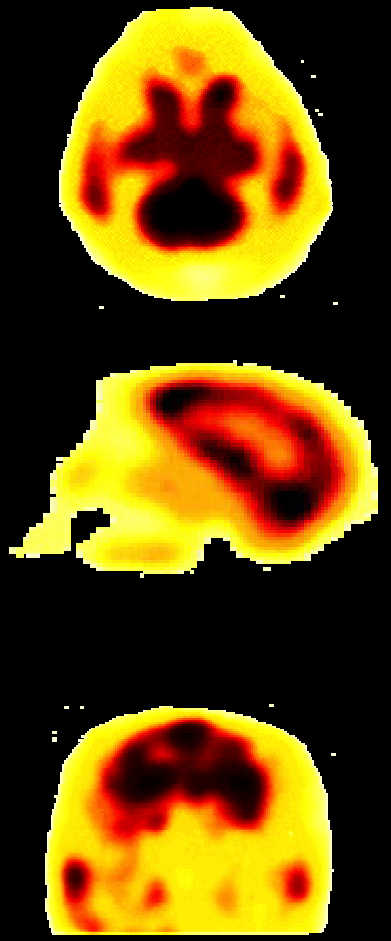


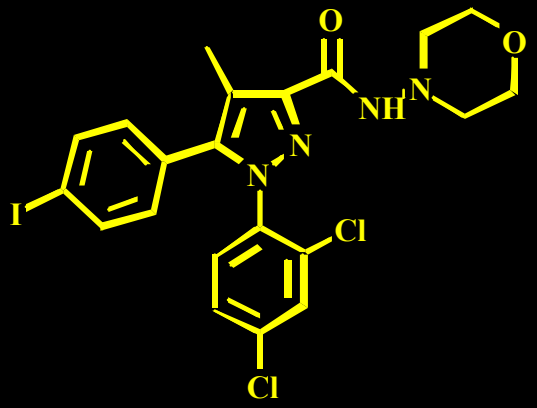
FIGURE 21-2. Scintillation camera detector.



SPECT Camera

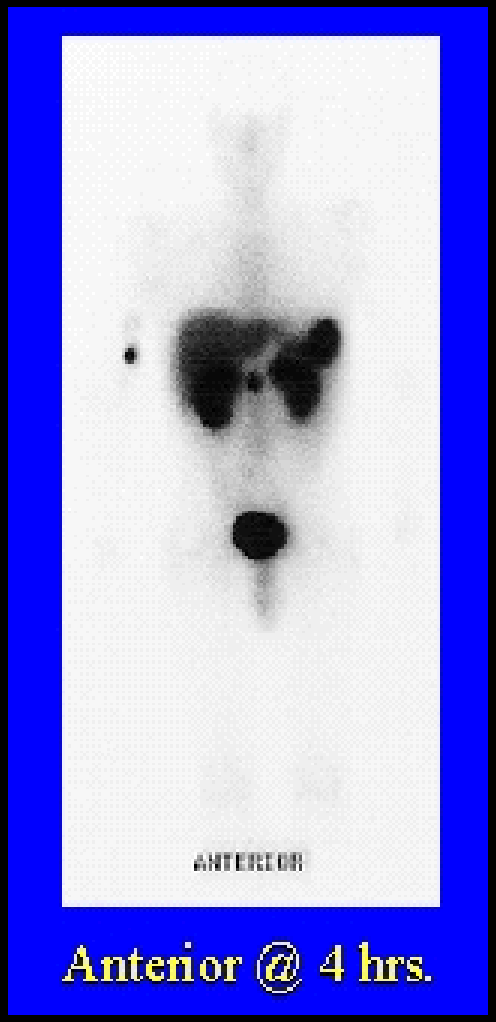
Imaging Cannabinoid Receptors with SPECT



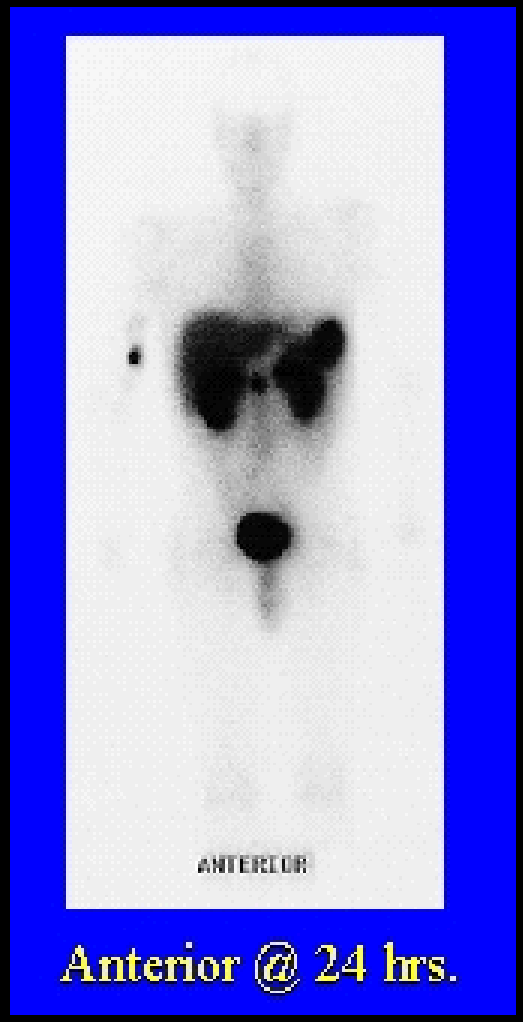


BNL

Other Applications of SPECT: Cancer Detection



Anterior @ 4 hrs.



Anterior @ 24 hrs.